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West Virginia No. 5

Forest Statistics for the Southwestern Section of West Virginia

Northeastern Forest Experiment Station

Upper Darby, Pennsylvania
Ralph W. Marquis, Director

1953

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United States Department of Agriculture • • • Forest Service

FOREWORD

This is the fifth in a new series of reports about forest areas and timber volume in the State of West Virginia. It is a product of the forest survey of the Northeast, carried on by the Northeastern Forest Experiment Station as part of the nation-wide forest survey being made by the Forest Service, U. S. Department of Agriculture.

This report supersedes the preliminary statistical report that was issued for the Cumberland Mountains Section of West Virginia in 1949. The volumes in that preliminary report were computed from standard volume tables. Local volume tables, constructed when the survey was completed for the entire State, showed that the average tree in West Virginia has more taper than was provided for in the volume tables originally used. This meant, of course, that the preliminary volume estimates were too high.

In addition, a recently completed study of log quality in the State showed that some of the material that was originally included in the saw-timber volume is unsuitable for standard lumber, tie, or timber logs. The total saw-timber volume has been reduced further to correct for this.

The West Virginia Conservation Commission provided the aerial photographs used in this survey, and assigned a number of Commission employees to assist in carrying out the field work.

Similar reports will be issued for the other three sections of the State.

Field work in this section of West Virginia was supervised by Harry W. Camp, Jr. C. Allen Bickford developed the statistical procedures used in the survey. Computations were made under the supervision of Roland H. Ferguson

Ralph W. Marquis

Ralph W. Marquis
Director

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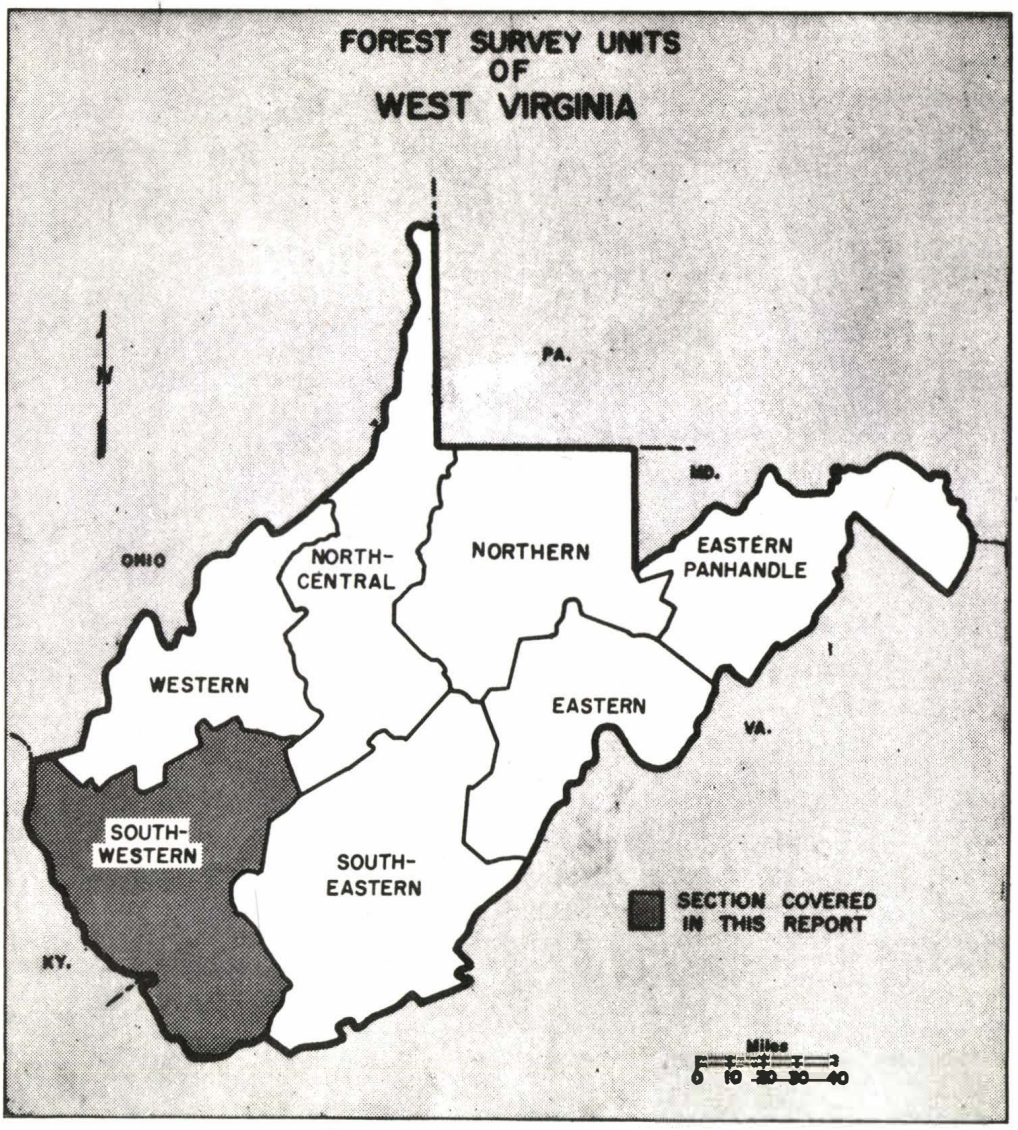
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FOREST STATISTICS

FOR THE

SOUTHWESTERN SECTION

OF WEST VIRGINIA

by

Robert D. Wray, *forest economist*

Northeastern Forest Experiment Station
Forest Service, U.S. Dept. Agriculture

GENERAL

The Southwestern Section of West Virginia includes eight counties: Boone, Kanawha, Lincoln, Logan, McDowell, Mingo, Wayne, and Wyoming. All lie in the Cumberland Mountains.

The land is rugged here except for the flood plains of the larger rivers. The mountains have steep slopes and sharp ridges, and most of the valleys are narrow. Coal mining is intensive throughout most of the area. Very little farming is done here.

The Forest Area

The eight counties of the Southwestern Section of West Virginia have a total land area of nearly 2-3/4 mil-

lion acres. This is the most heavily forested section of the State; four out of every five acres are forest land.

The forest area amounts to 2,224,000 acres. Except for about 100 acres that are reserved from cutting, all this forest land is available for commercial logging.

Ownership

Ninety-nine percent of the forest land in this section is privately owned. Farmers own 19 percent and other private owners 80 percent. Most of the latter is held in large tracts by mining companies.

The State owns 20,500 acres of forest land, mostly in State forests. Kanawha and Wayne Counties own a total of about 600 acres. The Federal Government owns no forest land in this part of the State.

The Forest Types

More than half the forest land is covered by oak forests, chiefly red oak. The yellow-poplar type is the next most extensive; it occupies 30 percent of the forests. The sugar maple-beech-yellow birch type covers 11 percent. The rest is in hard pine types and other minor types.

Condition Of The Forests

Forty-three percent of the saw-timber volume is found on 14 percent of the forest land. This is the land that supports stands of more than 5,000 board feet per acre.

About 38 percent of the forest land has stands of 1,500-5,000 board feet per acre. The remaining 48 percent of the forest land bears less than 10 percent of the saw timber found in the section. Much of this land (21 percent of the total) has little or no stocking in trees more than 5 inches in diameter.

Timber Volume

The Southwestern Section contains more than 4 billion board feet of saw timber. Nearly one-third of this is in red oak. About 39 percent of the saw-timber volume is in four other hardwood species--beech, yellow-poplar, chestnut oak, and hickory.

Only 5 percent is in softwood species--hard pines and hemlock. The rest is a mixture of other hardwoods.

(Although all of the volume reported above meets the requirements for saw timber, some of it may not be operable

from a strictly business viewpoint. Operability depends upon species, quality, volume per acre, accessibility, markets, and so on. These are the things that determine whether one can cut timber and make money. However, it is not within the scope of this statistical report to distinguish between operable and inoperable timber stands. The purpose here is merely to report the total amount of timber that exists in this part of West Virginia. These statistics will be analyzed later in a comprehensive report for the entire State.)

The growing stock amounts to more than 1.2 billion cubic feet (about 15 million rough, standard cords). Fifty-eight percent of this volume is in trees of less than 15 inches' diameter.

SOUTHWESTERN SECTION OF WEST VIRGINIA

Table 1.--Land area and forest area, 1949

Class	Area	
	Acres	Percent
Forest land:[1]		
Commercial	2,224,000	81
Noncommercial	100	(2/)
Total forest land	2,224,100	81
Nonforest land[3]	512,500	19
All land[4]	2,736,600	100

[1]See Appendix for definitions.

[2]Less than 0.5 percent.

[3]Includes about 13,000 acres of water in areas less than 40 acres.

[4]From Areas of the United States 1950, Bureau of the Census.

Table 2.--Land area and commercial forest area by county, 1949

County	Land	Commercial forest	
	Acres	Acres	Percent
Boone	320,700	289,600	90
Kanawha	581,100	439,000	76
Lincoln	280,300	212,600	76
Logan	291,800	253,800	87
McDowell	341,100	290,700	85
Mingo	270,700	240,000	89
Wayne	328,300	224,200	68
Wyoming	322,600	274,100	85
Total	2,736,600	2,224,000	81

SOUTHWESTERN SECTION OF WEST VIRGINIA

Table 3.--Commercial forest area by ownership, 1949

Ownership	Area	
	Acres	Percent
Private:		
Farm forest land[1]	425,900	19
Other private	1,777,000	80
Total private	2,202,900	99
Public:		
State[2]	20,500	1
County	600	(3/)
Total public	21,100	1
All ownerships	2,224,000	100

[1]Census of Agriculture, 1950.

[2]State Forests.

[3]Less than 0.5 percent.

SOUTHWESTERN SECTION OF WEST VIRGINIA

Table 4.--Commercial forest area by forest type, 1949

Forest type	Area	
	Acres	Percent
Red oak	708,500	32
Chestnut oak	236,700	11
White oak	225,800	10
Yellow-poplar	671,000	30
Sugar maple-beech-yellow birch	242,500	11
Hard pine types	123,400	5
Other types	16,100	1
All types	2,224,000	100

SOUTHWESTERN SECTION OF WEST VIRGINIA

Table 5.--Commercial forest area by stand-size class, 1949

Stand-size class	Area	
	Acres	Percent
Saw-timber stands:		
More than 5,000 bd.ft. per acre	323,000	14
1,500-5,000 bd.ft. per acre	834,500	38
Pole-timber stands:		
More than 600 cu.ft. per acre	203,400	9
200-600 cu.ft. per acre	393,200	18
Other stands	469,900	21
All stands	2,224,000	100

SOUTHWESTERN SECTION OF WEST VIRGINIA

Table 6.--Net volume of live timber on commercial forest land by species, 1949

Species	Growing stock		Saw timber[1]
	Thousand cu.ft.	Equivalent in cords[2]	Thousand bd.ft.
Red oak	308,900	3,861,200	1,295,100
Beech	105,700	1,321,200	480,900
Yellow-poplar	131,600	1,645,000	388,700
Chestnut oak	110,200	1,377,500	366,800
Hickory	151,700	1,896,300	365,300
White oak	87,400	1,092,500	196,800
Sugar maple	36,400	455,000	173,100
Gum	35,700	446,200	152,900
Basswood	40,800	510,000	133,400
Cucumbertree	19,400	242,500	99,100
Ash	18,800	235,000	51,200
Red maple	17,500	218,800	43,000
Other hardwood	92,200	1,152,500	107,700
All hardwood[3]	1,156,300	14,453,700	3,854,000
Hard pine	50,600	632,500	158,300
Hemlock	13,500	168,800	62,400
All softwood	64,100	801,300	220,700
All species	1,220,400	15,255,000	4,074,700

[1]International ¼-inch log rule.

[2]Rough standard cords. 1 cord = 80 cubic feet.

[3]In addition there are 223 million cubic feet (net volume) in live cull trees.

Table 7.--Net volume of live timber on commercial forest land by diameter class, 1949

Diameter class[1] (inches at breast height)	Growing stock	Saw timber
	Thousand cu.ft.	Thousand bd.ft.
Hardwood:		
6	125,600	--
8	162,800	--
10	160,000	--
12	117,700	493,500
14	102,600	505,400
16	116,200	627,100
18	104,000	589,900
20	92,400	549,000
22	82,200	496,800
24	48,600	302,300
26	20,400	132,300
28	16,100	106,100
30 and larger	7,700	51,600
All hardwoods	1,156,300	3,854,000
Softwoods:		
6	6,000	--
8	7,600	--
10	8,700	30,500
12	12,500	52,000
14	7,900	34,600
16	5,700	26,400
18	7,300	34,700
20	3,100	15,400
22 and larger	5,300	27,100
All softwoods	64,100	220,700
Softwoods and hardwoods	1,220,400	4,074,700

[1]The midpoint of each 2-inch diameter class is indicated.

SOUTHWESTERN SECTION OF WEST VIRGINIA

Table 8.--Average net volume per acre of live timber on commercial forest land, by stand-size class, 1949

Stand-size class	Growing stock	Saw timber
	Cubic feet	Board feet
Saw-timber stands:		
More than 5,000 bd.ft. per acre	1,250	5,500
1,500-5,000 bd.ft. per acre	680	2,340
Pole-timber stands	340	400
Other stands	90	230
All stands[1]	550	1,830

[1]Hardwood constitutes 95 percent of the total board-foot volume, or 95 percent of the total cubic-foot volume.

APPENDIX

DEFINITIONS OF TERMS

Forest Area

Forest land area.--Includes (a) lands that are at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting influence on the climate or on the water regime; (b) land from which the trees described in (a) have been removed to less than 10 percent stocking and which has not been developed for other use; and (c) afforested areas. (Forest tracts of less than 1 acre and isolated strips of timber less than 120 feet wide are excluded.)

Commercial forest land area.--Forest land that is (a) producing, or physically capable of producing, usable crops of wood (usually saw timber), (b) economically available now or prospectively, and (c) not withdrawn from timber utilization.

Noncommercial forest land area.--Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order, but that otherwise qualifies as commercial forest land, or (b) incapable of yielding usable wood products (usually saw timber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Forest Types

Forest types are defined according to the species, or species group, that make up the major portion of the stand in terms of board feet in saw-timber stands or number of stems in other stands.

The type names are self-explanatory. "Hard pine types" include the pitch pine-shortleaf pine-Virginia pine type and the hard pine-oak type. "Other types" include the hemlock type and river birch-sycamore type.

Stand-Size Classes

Saw-timber stands.--Stands with saw-timber trees having a minimum net volume per acre of 1,500 board feet, International $\frac{1}{4}$-inch rule.

Pole-timber stands.--Stands failing to meet the saw-timber stand specification, but at least 10 percent stocked

with pole-timber and larger trees, (5.0 inches d.b.h. and larger), and with at least half of the minimum stocking in pole-timber trees. (Pole-timber stands carry at least 200 cubic feet per acre.)

Other stands.--Forest stands that do not qualify as saw-timber or pole-timber; stands of seedlings and saplings; nonstocked areas.

Tree Classes

Saw-timber trees.--Trees of commercial species that contain at least one merchantable sawlog as defined by regional practice and which are of the following minimum diameters at breast height (d.b.h.): Softwoods 9.0 inches and hardwoods 11.0 inches. (All butt sawlogs are considered merchantable. Where the butt is defective, upper sawlogs are considered merchantable if they account--in terms of aggregate volume--for 50 percent or more of the gross volume below the top of the uppermost sawlog. Softwood sawlogs are at least 6 inches in diameter, inside bark at small end; 8 to 16 feet in length; sound and straight enough to be manufactured into standard lumber. The smaller logs are generally free of surface defects other than small tight knots. Hardwood sawlogs are at least 8 inches in diameter, inside bark at small end; 8 to 16 feet in length; suitable for sawing into standard lumber, construction timber, or ties.)

Pole-timber trees.--Trees 5.0 inches d.b.h. and larger of commercial species that do not meet the specifications for saw-timber trees but do meet regional specifications of species, soundness, and freedom from defect. (These are the trees that are straight and clear enough to make saw-timber trees eventually.)

Seedling and sapling trees.--Trees of commercial species less than 5.0 inches d.b.h.

Cull trees.--Live trees of saw-timber or pole-timber size that are unmerchantable for sawlogs now or prospectively because of defect, rot or species.

Timber Volume

Growing stock.--Net volume, in cubic feet, of live saw-timber trees and live pole-timber trees from stump to a minimum 4.0-inch top (of central stem) inside bark.

(This volume is also given in rough, standard cords, bark included. Cord volume is derived from cubic-foot volume by applying a factor of 80 cubic feet per cord.)

Saw-timber volume.--Net volume in board feet, International $\frac{1}{4}$-inch rule, of live saw-timber trees.

FOREST SURVEY METHODS

These forest statistics for the Southwestern Section of West Virginia are based on information gathered from sample plots. These plots are distributed randomly over the entire area.

They were first located on aerial photographs. Trained photo interpreters then examined the photos and classified each forest plot according to stand size. Field crews inspected enough plots on the ground to attain a specified level of statistical accuracy. Species and volume data were collected on these ground plots.

The survey was designed for maximum accuracy in the estimate of total merchantable cubic volume.

ACCURACY OF THE ESTIMATES

The estimates in this report may contain two kinds of error.

First, photo interpreters may make mistakes of judgment and fieldmen may make mistakes in measuring or recording. There is no practical way of finding out just how often such errors occur. But they are kept to a minimum by closely checking all phases of the work.

The second kind of error is associated with sampling procedures. The size of this error can be measured. In the Southwestern Section the chances are 2 to 1 that the error will not exceed 1.1 percent of the total forest area, 6.6 percent of the total board-foot volume, or 4.4 percent of total cubic-foot volume.

In each of the tables, the total figures are more reliable than the subtotals. The subtotals are more reliable than any of the individual figures. Figures that are small in relation to totals are subject to larger sampling errors.

SPECIES TALLIED

The various commercial tree species tallied in the Southwestern Section of West Virginia are listed below.[1] Approved common names are shown in parentheses if these differ from the brief name used in the tables.

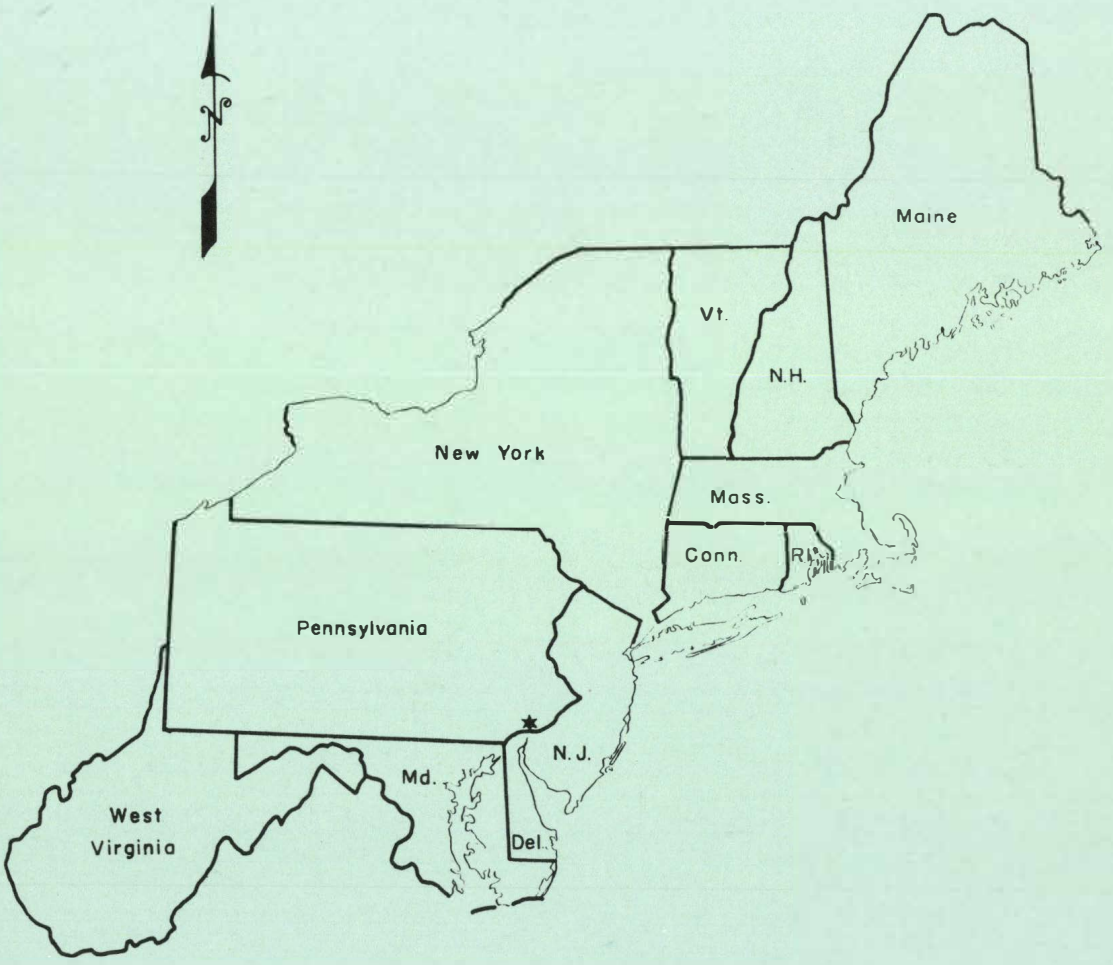
Hardwoods

Red oak (Northern red oak)	- Quercus borealis
(Black oak)	- Quercus velutina
(Scarlet oak)	- Quercus coccinea
Beech (American beech)	- Fagus grandifolia
Yellow-poplar	- Liriodendron tulipifera
Chestnut oak	- Quercus montana
Hickory	- Carya species
White oak	- Quercus alba
Sugar maple	- Acer saccharophorum
Gum (Blackgum)	- Nyssa sylvatica
(Sweetgum)	- Liquidambar styraciflua
Basswood (American basswood)	- Tilia americana
Cucumbertree	- Magnolia acuminata
Ash	- Fraxinus species
Red maple	- Acer rubrum
Other hardwoods	
(Yellow birch)	- Betula lutea
(Sweet birch)	- Betula lenta
(Black walnut)	- Juglans nigra
(Butternut)	- Juglans cinerea
(Black locust)	- Robinia pseudoacacia
(American elm)	- Ulmus americana
(American sycamore)	- Platanus occidentalis
(Yellow buckeye)	- Aesculus octandra

Softwoods

Hard pine (Pitch pine)	- Pinus rigida
(Virginia pine)	- Pinus virginiana
Hemlock (Eastern hemlock)	- Tsuga canadensis

[1] U.S. FOREST SERVICE. CHECK LIST OF THE NATIVE AND NATURALIZED TREES OF THE UNITED STATES INCLUDING ALASKA. 325 PP. WASHINGTON. 1949.



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